REMARKS

Claims 1-31 are all the claims pending in the application. This Amendment amends claims 1, 13, 18 and 20, adds claim 24-31, and addresses each point of rejection raised by the Examiner. Favorable reconsideration is respectfully requested.

Applicants thank the Examiner for acknowledging the claim for foreign priority, noting that the priority documents have been received, initialing the Information Disclosure Statement of August 11, 1999, and acknowledging the drawings filed October 15, 1999.

Claims 1-12 are rejected under 35 U.S.C. § 102(b) as unpatentable over U.S. Patent No. 6,128,000 to Jouppi *et al.* (herein "Jouppi"). Claims 13-17 are rejected under 35 U.S.C. § 103(a) as unpatentable over Jouppi in view of U.S. Patent No. 5,748,164 to Handschy *et al.* (herein "Handschy"). Claims 18 to 23 are rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,018,237 to Havel (herein "Havel") in view of *Computer Graphics: Principles and Practice*, Second Edition (Addison-Wesley, 1990) by Foley *et al.* (herein "Foley").

Applicants have amended claims 1, 13, and 20 to improve antecedence and form. These amendments are not necessitated by the Examiner's rejections and do not substantively narrow the claims, but rather, are intended to improve readability and grammar. The Applicants respectfully request that the Examiner consider these amendments, but respectfully traverse the grounds of the § 102(b) and § 103(a) rejections of the claims, as filed, for the reasons set forth below.

As applied to claim 1, Applicants respectfully submit that the teachings of Jouppi would not have rendered this claim anticipated for the following reasons.

Claim 1 requires a display device that expresses each picture element of a monochromatic image utilizing the output of a series of cells. By utilizing a series of cells to express each picture element, a larger number of tones of a monochromatic image are displayed, in comparison to conventional systems. *See* page 7, lines 3-7.

In comparison, the display device of Jouppi expresses each picture element utilizing a single pixel, the pixel subdivisions and fragment triples cited by the Examiner being an element of the supersampling method, is not outwardly expressed (*i.e.* shown) by the display.

Jouppi is directed to eliminating "aliasing artifacts in images defined by pixels." Jouppi column 1, lines 8 and 60. This is accomplished using "improved supersampling techniques." Jouppi column 1, line 61. "Supersampling involves *taking more samples of an image than there are pixels to be displayed.* Such samples are taken at subpixel positions within each pixel. The color and intensity displayed for each pixel comes from combining the subpixel samples." Jouppi column 1, lines 21-26 (emphasis added).

The invention of Jouppi "comprises a graphics device that selects subpixel positions, in a pixel as sample points, and a memory coupled to the graphics device. The memory stores a fragment value associated with a fragment of the image. The fragment covers one or more of the sample points in the pixel, and is used to develop an image. The graphics device links each

covered sample point to the stored fragment value to enable the generation of a color of the pixel using the fragment value. When the pixel is rendered, the generated color improves the perceived quality of the image by reducing aliasing artifacts." Jouppi column 2, lines 23-34.

"To compute a color for the pixel 300, the color value 304 of each stored fragment triple 310, 312 is multiplied by the percentage of subpixel samples linked by an index to that fragment triple. Then these weighted color values are added together to produce the pixel color." Jouppi column 13, lines 47-51. Applicants respectfully submit this does not suggest the series of cells of the claimed invention.

Further, claim 1 requires that the output luminance of a picture element is an *average* of all the cells within the element. In comparison, the weighted color values of the fragments of Jouppi are added together to produce the pixel color, whereby the output luminance would be the sum of the RGB cells within the color pixel (R + G + B). *See* discussion of RGB luminance on page 5, lines 7-21. Applicants submit that this does not suggest the output luminance required in claim 1.

Applicants submit that claims 2-12, which depend from claim 1, are also patentable over Jouppi at least for the reasons claim 1 is patentable.

Moreover, color displays utilize a luminance ratios of about R:G:B=0.3:0.6:0.1. This does not suggest that the output luminances of the cells are substantially uniform, as required in claim 2.

Moreover, regarding the rejection of claim 11, Applicants respectfully disagree with Examiner's interpretation of Jouppi column 5, lines 36-46. The passage cited by the Examiner states: "Fragment values are called fragment triples because each fragment triple 310, 312 includes three values: a color value 304, a Z-depth value 306, and a stencil value 308. ..." Jouppi column 5, lines 36-38. As explained above, a fragment covers one or more of the *sample* points in the pixel. Thus, "fragment triples" are an element of supersampling, and the three values contained therein do not suggest forming a picture element of a monochromatic display using three cells.

Applicants submit that claims 13-17 are also patentable for the reasons above. Jouppi is directed to supersampling anti-aliasing techniques (*i.e.* graphics processing), not to the actual display device utilized to display the results. "For the purpose of practicing the invention" of Jouppi, the display device may be a CRT, or "any other pixel-based display such as a liquid-crystal display or a dot matrix printer" *See* Jouppi column 3, lines 28-30 and 41-44. Handschy, in comparison, is directed to a miniature display system in which "each pixel comprises a subcircuit or cell including only one active component." Handschy column 8, lines 65-66. Neither Jouppi nor Handschy, individually or in combination, suggest expressing each picture element of a display using a series of cells. Thus, Applicants assert that claims 13-17 are patentable.

Moreover, regarding claim 14, the applied art does not suggest having one cell within an element that has a maximum output level that is substantially the same as one level of output of

another cell within the element. *See* Fig. 11A-D. This feature allows the tone levels of the picture element to be more finely divided. *See* page 18, lines 13-17.

Moreover, regarding claim 17, the applied art does not suggest two cells within a picture element emitting light *in the same color* at different luminances.

Regarding claims 18-23, the Examiner asserts that Havel teaches all of the claimed limitations except providing the region surrounded by points (0.174, 0), (0.4, 0.4) and (α, 0.4) as represented by co-ordinates (x, y) on a CIE chromaticity diagram, and that Foley teaches the CIE Chromaticity diagram. The Examiner further asserts that "it would have been obvious to utilize the CIE [chromaticity] diagram as taught by Foley et al. in the digital multimeter disclosed by Havel because this would allow to place the points anywhere in the region to measure the dominant wavelength and [excitation] purity of any color."

Applicants respectfully submit that Havel clearly teaches away from making a monochromatic display, as required by claim 18. "Multimeters with monochromatic digital display are well known and extensively used. Such multimeters, however, area capable of indicating value of only one measured quantity at a time." Havel column 1, lines 43-46. "The principal object of this invention [is] to provide a measuring instrument with a variable color digital display." Havel column 1, lines 65-67. "Completely new, unexpected and heretofore impossible, features may be obtained when a well known monochromatic digital display is substituted with a variable color digital display." Havel column 2, lines 2-5.

The entire purpose of the Havel invention clearly relies upon replacing the monochromatic display of a multimeter with a color display. Combining the CIE chromaticity diagram of Foley with Havel still does not suggest motivation for forming a monochromatic display, but rather, an alternative to the ICI chromaticity diagram in Havel Figure 40, for blending the colors of the element LEDs forming the color display. *See* Havel column 18, lines 49-57. Thus, there would be absolutely no motivation, even with the benefit if hindsight, to modify Havel to provide a monochromatic display, as required in claims 18-23.

Additionally, the art of record offers no motivation to build a monochrome display in the color as defined in claim 18, absent knowledge of the medical application as presented in the present disclosure.

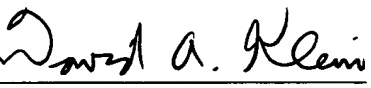
Applicants add new claims 24-31. No new matter is added. For the Examiner's convenience, Applicants provide the following examples of where support may be found in the specification for these new claims: Claim 24 at page 43; Claim 25 at page 36; Claims 26 and 27 at page 45; Claim 28 at page 13; Claim 29 at page 22; Claim 30 at page 7; and Claim 31 at page 69. These pages are cited solely to establish that the new claims contain no new matter, as support for the subject matter of these claims is not limited to the particular pages cited. Applicants submit that new claims 24-31 are patentable at least as further limitations on patentable base claims.

Further, regarding claim 30, which depends from claim 18 and recites a series of cells forming each monochromatic picture element, Applicants submit that Havel teaches to use closely adjacent color LED's (*e.g.*, red, green and blue) to form each display segment, which does not suggest the claimed monochromatic picture element. *See, e.g.,* Havel column 7, line 26, and column 8, line 27.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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APPENDIX
(VERSION SHOWING CHANGES)

Please amend claims 1, 13, 18, and 20 as follows:

1. (Amended) A monochromatic image display system comprising:

a display device comprising a plurality of picture elements, each picture element comprising [which can express each picture element of a monochromatic image by] a series of cells, each [of which can express] cell expressing tones in multiple levels; [,] and

a cell signal generating means which generates, [on the basis of] based on a monochromatic image signal [determining the] indicating an output luminance of a monochromatic image, a cell signal for each cell which determines [the] an output tone level of the cell, so that an average of the output luminances of all the cells [for] within each respective picture element correspond to an output luminance of the respective picture element,

wherein each cell of said series of cells emits light in a same color, and

wherein the output luminances of the plurality of picture elements express said monochromatic image.

13. (Amended) A monochromatic image display system comprising:

a display device comprising a plurality of picture elements, each picture element comprising [which can express each picture element of a monochromatic image by] a series of cells, each [of which can express] cell expressing tones in multiple levels, and at least two of

[which have] said series of cells having maximum [out] output levels different from each other; [,] and

a drive means which drives the cells so that the output level difference per one level differs from each other between said at least two of said series of cells,

wherein each cell of said series of cells emits light in a same color, and

wherein the plurality of picture elements express a monochromatic image.

18. (Amended) A flat panel image display system using a flat panel-like display device, the display device comprising a series of cells, each cell of said series of cells emitting light in a same color, characterized in that the display device is a monochromatic display device which makes a display in a color which falls within the region surrounded by points (0.174, 0), (0.4, 0.4) and (α, 0.4) as represented by co-ordinates (x, y) on a CIE chromaticity diagram, wherein α represents the x-coordinate of the intersection of a spectrum locus and a straight line y=0.4.

20. (Amended) A flat panel image display system as defined in Claim 18, [in which] the display device [comprises] further comprising a plurality of [cells and can express each picture element of a monochromatic image by a series of cells] picture elements, each picture element comprising the series of cells, each cell expressing tones in multiple levels, and the plurality of picture elements expressing a monochromatic image, and

there is provided at least one of:

an area modulation means which controls the output luminance of each picture element by selectively [turns] turning on and off input signals to respective cells, for each [the] picture element, independently of each other,

a time modulation means which drives the respective cells for each picture element in a time division system, and

an intensity modulation means which controls input signal levels to the respective cells for each picture element independently of each other,

wherein the cells are driven so that the maximum luminance of each picture element is in the range of 100cd/m^2 to 10000cd/m^2.

Claims 24-31 are added as new claims.